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EXAMINER

LI, SHI K

ART UNIT	PAPER NUMBER
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2633

DATE MAILED: 03/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/072,057

Applicant(s)

STILLING, BERND

Examiner

Shi K. Li

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 December 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-4 and 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda (M. Maeda, "Management and Control of Transparent Optical Networks", IEEE Journal on Selected Areas in Communications, Vol. 16, No. 7, September 1998) in view of Chaudhuri et al. (U.S. Patent Application Pub. 2002/0030864 A1).

Regarding claim 1, Maeda discusses management and control of optical network which comprises a plurality of nodes, one of which is shown in FIG. 2. Maeda teaches on page 1009, left col., third paragraph that there are two kinds of optical crossconnect: wavelength-selective crossconnect (WSXC) and wavelength-interchanging crossconnect (WIXC). Maeda teaches on Section III.B (starting on page 1014) connection setup. Maeda focuses on transparent optical networks where the same wavelength is used for a path throughout a network. Maeda teaches on page 1015, left col., third paragraph that optical transparency may be limited to subnetworks with regeneration (wavelength converter) at the intersubnetwork boundaries. Maeda discloses in FIG. 7 a connection setup algorithm. In summary, Maeda teaches that if an optical connection is to be set up where the source node and the destination node are in different subnetworks, nodes with wavelength converter can be used at intersubnetwork boundaries. The overall optical

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connection is the concatenation of sub-paths, each of which is within a subnetwork wherein a sub-path can be set up as illustrated in FIG. 7.

The difference between Maeda and the claimed invention is that Maeda does not teach using connection vector for identifying available WDM transmission channels. Chaudhuri et al. teaches in paragraph [0092] to use a vector of the same size as the number of wavelengths for probing message to determine appropriate wavelength choice. One of ordinary skill in the art would have been motivated to combine the teaching of Chaudhuri et al. with the optical network of Maeda because a vector representing wavelength availability records the intersection of available wavelengths for each link that the message has traveled so far and acts as a convenient tool for determining commonly available wavelengths for a sub-path within a subnetwork. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to include connection vector in setup message, as taught by Chaudhuri et al., in the optical network of Maeda because a vector representing wavelength availability records the intersection of available wavelengths for each link that the message has traveled so far and acts as a convenient tool for determining commonly available wavelengths for a sub-path within a subnetwork. For a connection with one or more regenerators (wavelength converters), the originating node generates a first connection vector and the first wavelength converter generates a further connection vector.

Regarding claim 2, Chaudhuri et al. teaches in paragraph [0092] to mark wavelength availability with the vectors.

Regarding claim 3, Chaudhuri et al. teaches in paragraph [0092] to mark a wavelength as unavailable if the wavelength is not available or does not exist.

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Regarding claim 4, Chaudhuri et al. teaches in paragraph [0092] that the vector has the same size as the number of wavelength channels.

Regarding claim 7, inherently a WIXC has processor and memory for storing and processing connection vector (Maeda shows in FIG. 4 a WSXC with processor; WIXC is similar to WSXC with additional wavelength converters).

Regarding claim 8, Chaudhuri et al. teaches in paragraph [0092] that multiple lightpaths can be simultaneously established using the same wavelength available information.

3. Claims 5-6 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda and Chaudhuri et al. as applied to claims 1-4 and 7-8 above, and further in view of Ashwood Smith (U.S. Patent 6,738,354 B1).

Maeda and Chaudhuri et al. have been discussed above in regard to claims 1-4 and 7-8. Regarding claims 5 and 6, the difference between Maeda and Chaudhuri et al. and the claimed invention is that Chaudhuri et al. teaches in paragraph [0029] to send the vector to the source OLXC where a wavelength is chosen and path is setup from the source OLXC while the claimed invention suggests to choose a wavelength at the destination. Ashwood Smith suggests in FIG. 3 that the destination chooses a wavelength from the available set and notifies the preceding network nodes. One of ordinary skill in the art would have been motivated to combine the teaching of Ashwood Smith with the modified optical network of Maeda and Chaudhuri et al. because by choosing wavelength at the destination and notifying preceding nodes, messages only need to traverse all nodes along the path once while choosing wavelength at the source requires sending the available wavelengths to the source from the destination and then notifying the nodes along the path. That is, messages have to transverse the path once in the reverse direction and

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once in the forwarding direction in the procedure suggested by Chaudhuri et al. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to choose a wavelength at the destination, as taught by Ashwood Smith, in the modified optical network of Maeda and Chaudhuri et al. because this approach requires messages to transverse the path once while the method suggested by Chaudhuri et al. requires messages to transverse the path twice.

Regarding claim 10, Ashwood Smith teaches in FIG. 3 and col. 6, lines 4-5 to send mapping messages for indicating the wavelength channel selected.

4. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda, Chaudhuri et al. and Ashwood Smith as applied to claims 5-6 and 10 above, and further in view of Okamura (U.S. Patent 6,618,400 B1).

Maeda, Chaudhuri et al. and Ashwood Smith have been discussed above in regard to claims 5-6 and 10. The difference between Maeda, Chaudhuri et al. and Ashwood Smith and the claimed invention is that Maeda, Chaudhuri et al. and Ashwood Smith do not teach to include information indicating number of connections in the connection message. Since Chaudhuri et al. teaches in paragraph [0029] that multiple lightpath can be simultaneously established using the same wavelength available information, it would have been obvious to include information specifying the desirable number of connections to be setup simultaneously. For example, Okamura teaches in FIG. 3B to include required number of channels as a parameter in connection setup message. One of ordinary skill in the art would have been motivated to combine the teaching of Okamura with the modified optical network of Maeda, Chaudhuri et al. and Ashwood Smith because a parameter specifying the number of connections allows nodes along the setup path to determine whether enough wavelengths are available and discover error

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condition early. The parameter also allows destination node to select a plurality of wavelengths according to the number of connections that is specified by the parameter. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to include in the setup message a parameter specifying the number of connections, as taught by Okamura, in the modified optical network of Maeda, Chaudhuri et al. and Ashwood Smith because it allows early discovery of error condition; it also allows destination node to select a plurality of wavelengths according to the number of connections that is specified by the parameter.

5. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda, Chaudhuri et al. and Ashwood Smith as applied to claims 5-6 and 10 above, and further in view of Kim et al. (B. Kim et al., "Constraint-Based LSP Setup by Message Reversing of CR-LDP", Proceeding of 15th International Conference on Information Networking, 31 Jan-2 Feb 2001).

Maeda, Chaudhuri et al. and Ashwood Smith have been discussed above in regard to claims 5-6 and 10. The difference between Maeda, Chaudhuri et al. and Ashwood Smith and the claimed invention is that Maeda, Chaudhuri et al. and Ashwood Smith do not teach to include a validity range in an occupancy message. Chaudhuri et al. suggests in paragraph [0077] that Resource Reservation Protocol (RSVP) and Constraint-based Routing Label Distribution Protocol (CR-LDP) are candidate protocols for lightpath setup. The similarity between Multiprotocol Label Switching and wavelength assignment has also been extensively discussed, e.g., see Awduche et al. (D. Awduche et al., "Multi-Protocol Lambda Switching: Combining MPLS Traffic Engineering Control with Optical Crossconnects, IETF, draft-awduche-mpls-te-optical-0.1, November 1999). Kim et al. teaches in FIG. 1 CR-LDP which is similar to the lightpath setup procedure of FIG. 3 of Ashwood Smith. Kim et al. teaches on page 877, left col.,

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second paragraph that the LSP ID parameter in the LabelMapping message identifies the validity range of the label. One of ordinary skill in the art would have been motivated to combine the teaching of Kim et al. with the modified optical network of Maeda, Chaudhuri et al. and Ashwood Smith to include in the mapping message of Ashwood Smith a session identification similar to the LSP ID for identifying the connection setup session because many connection setup sessions may coexist simultaneously in the network and session identification is necessary to correlate messages with the session to which they belong. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a session identification, which includes information to indicate validity range of the selected wavelength, in the mapping message, as taught by Kim et al., in the modified optical network of Maeda, Chaudhuri et al. and Ashwood Smith because many connection setup sessions may coexist simultaneously in the network and session identification is necessary to correlate messages with the session to which they belong.

Response to Arguments

6. Applicant's arguments filed 14 December 2005 have been fully considered but they are not persuasive.

The Applicant argues that the optical network described in Chaudhuri does not utilize wavelength converters as required in the present claims, and is explicitly relied upon Maeda. As such, one having ordinary skill in the art would have to teaching, suggestion or motivation to combine the references in the manner suggested in the Office Action. The Applicant cites some appeal board and court decisions and concludes that it simply makes no sense to combine the aforementioned references to this end as the usage of one vector in conjunction with a

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wavelength-interchanging cross connect has the disadvantage that it can be implemented only to a restricted extend, as the capability of wavelength conversions can not be used with one vector. Furthermore, the Applicant argues that there is no teaching in either of the references to use a further (second) vector as recited in the claims. The Examiner disagrees.

As stated in the rejection above, Maeda teaches that if an optical connection is to be set up where the source node and the destination node are in different subnetworks, nodes with wavelength converter can be used at intersubnetwork boundaries. The overall optical connection is the concatenation of sub-paths, each of which is within a subnetwork wherein a sub-path can be set up as illustrated in FIG. 7. However, Maeda is silence about how to find an idle wavelength for setup a connection without wavelength converter within a subnetwork. Chaudhuri et al. teaches in paragraph [0092] to use a vector of the same size as the number of wavelengths for probing message to determine appropriate wavelength choice. It is a systematic way of determining idle wavelength available along a lightpath. One of ordinary skill in the art would have been motivated to combine the teaching of Chaudhuri et al. with the optical network of Maeda because a vector representing wavelength availability records the intersection of available wavelengths for each link that the message has traveled so far and acts as a convenient tool for determining commonly available wavelengths for a sub-path within a subnetwork. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to include connection vector in setup message, as taught by Chaudhuri et al., in the optical network of Maeda. Furthermore, for a lightpath crossing a plurality of subnetworks, a difference connection vector is used for each subnetwork as the lightpath crossing intersubnetwork boundaries where wavelength converters are used for converting wavelength as taught by

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Maeda. That is, as a whole the combination of Maeda and Chaudhuri et al. teaches using connection vector for finding available idle wavelengths suitable for a segment of a path within a subnetwork and deploying wavelength converters at intersubnetwork boundaries. As the setup process continues across intersubnetwork boundary, a different connection vector is used to account for the new idle wavelengths available in the next subnetwork. Therefore, the combination of Maeda and Chaudhuri et al. is proper and teaches all the limitations of the claimed invention.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shi K. Li whose telephone number is 571 272-3031. The examiner can normally be reached on Monday-Friday (8:30 a.m. - 5:00 p.m.).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on 571 272-3022. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

skl

10 March 2006



Shi K. Li
Patent Examiner